Onderzoek van residuen op aardewerk in de archeologische praktijk

Botanische resten in residuen

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prehistoric vessel use

- what foods (and non-food products) were prepared in ceramic vessels?
- how people prepared their everyday meals?
- what pots were used for what kind of foods?
Organic residues mounted on SEM stubs using carbon tape and coated with a platinum-palladium coating.
SEM botanical analysis

Plant tissue in organic residues:

- emmer chaff\(^1\) (fragments of glumes, lemma/palea)
- barley chaff (glumes, lemma/palea)
- emmer grain pericarp tissues\(^2\) (transverse and longitudinal cells)
- emmer and barley\(^3\) aleurone layer
- stem/leaf fragments from herbaceous plants
- seed/nut parenchyma

None-plant remains:

- fish scales\(^4\), animal bone fragments
Early Neolithic Swifterbant (site S3) 4300-4000 CAL BC

Pot 3

medium crust, loose/porous

Pot 7

thick crust, loose, glossy

Photos: T. Oudemans
S3 (pot 3 & 7) – SEM images of emmer chaff epidermis (*glumes, lemma/palea*) embedded in fused residue matrices

DTMS: mixtures of proteins, polysaccharides and lipids
Naked barley
Swifterbant Site S25 – SEM images of barley chaff embedded in residue matrix
Swifterbant S3: Pot 15 – SEM images with fish scale and emmer chaff embedded in residue matrix
rather solid, thick crust

SEM S3: pot 24 - leaf tissue and stem fragment of a herbaceous plant
Late Neolithic EGK, Noord Holland, c. 3000 and 2600 cal BC

Keinsmerbrug Vessel 3
SEM: silicified emmer chaff epidermis embedded in residue matrix
DTMS: animal fat and starch
Zeewijk vessel 15
SEM: acorn cotyledon parenchyma. Traces of vascular tissue are marked by red arrows.
DTMS: no chemical signal

Acorn mush – experimentally charred
Starchy endosperm - inner part of the grain (usually fused through charring)

Aleurone layer – stores the grain’s protein contents (preserved in processed cereal foods)
Pestenacker: SEM of a single-layered aleurone tissue from emmer grain
Velsen-Waterland (Bronze Age)

SEM micrographs of multi-layered aleurone tissue from barley grain
Velsen-Waterland (Bronze Age)

...één cluster van drie lintbloemige composieten...

...and an example of recent pollen from Compositae Liguliflorae subfamily
Wierden, Enter “De Akkers”
gevonden delen van Pot 408
Vroege IJzertijd
Deel 2 - De Praktijk

1) sherds with organic residues from:

   Early Neolithic Swifterbant (S4)
   Middle Neolithic Vlaardingen
   Bronze Age (Velsen-Waterland)

*Under the binocular incident light microscope, food crusts are visible as patches of amorphous material, often black or brownish-black in color. The crusts often have a shiny or glossy appearance; however, crusts with a dull appearance are also observed. The thickness of the crust layers may vary from fine (c. 1 mm) to thick (c. 4mm). Their internal structures range from solid and hard to loose/‘spongy’ and soft.

2) Two pots with experimentally cooked (and burnt) plant-based food/dishes (& non-plant element)
Ecodorp Bergen – experimental cooking
Pot 1 – charred meal made of emmer grain and fish
Pot2 - charred lentil mush
Concluding thoughts

Please always give a gentle wash to the sherds

Please never wash sherds with brushes, mind the organic residues